Zero Retries issue 0167 2024-08-30

Zero Retries is an independent newsletter promoting technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Radios are computers - with antennas! Now in its fourth year of publication, with 2000+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

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Web version of this issue - https://www.zeroretries.org/p/zero-retries-0167

Request To Send

Commentary by Editor Steve Stroh N8GNJ

Paid Subscribers Update

My thanks to **Ben Kuhn KU0HN** for *renewing* as a **Founding Member Annual Subscriber** to Zero Retries this past week!

My thanks to **Craig Cherry N7RWB** for *upgrading* from a free subscriber to an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 47** for *upgrading* from a free subscriber to an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 48** for *upgrading* from a free subscriber to an **Annual Paid Subscriber** to Zero Retries this past week, with this message:

> Thanks a lot for the M17 Project information.

You're quite welcome "Anonymous 48" - much more M17 info to come!

My thanks to **Dan Marler K7REX** for becoming an **Annual Paid Subscriber** to Zero Retries this past week!

Financial support from Zero Retries readers is a significant vote of confidence for continuing to publish Zero Retries.

The "APRS Foundation Issue" of Zero Retries

This issue of Zero Retries became dominated by coverage of APRS Foundation and the Appalachian Trail Golden Packet 2024 event, which as you'll read has some overlap with the APRS Foundation.

I also included ~~two~~ three postings, verbatim, from the aprssig email list, only because my assumption is that many Zero Retries readers are not actively following the two APRS related email lists because there's been minimal "news" on APRS until very recently. And, those ~~two~~ three postings were directly related to the articles resulting from my interview of APRS Foundation President Jeff Hochberg W4JEW in this issue.

The two APRS related email lists - aprssig sponsored by TAPR, and APRS sponsored by Joe Sammartino N2QOJ are (to the best of my knowledge) the primary communication channels of the APRS community worldwide. Both are free and open to subscribe to, so if you want to follow APRS developments closely, I suggest subscribing to them.

Organizationally, APRS Foundation will have a lot of activity over the coming months, and I don't anticipate covering that "administrivia" very closely. If there is progress about the APRS "Specification", new APRS software or hardware, etc., *that* technological innovation will obviously be very Zero Retries Interesting and thus mentioned here in Zero Retries. But, mostly I wanted to reassure Zero Retries readers that Zero Retries has *not* been turned over to full time coverage of every nuance of the APRS Foundation.

STORI
&
FORWA

Store and Forward Podcast Episode 5 - Admiral Hopper

Kay Savetz K6KJN and I have released Episode 5 of **Store and Forward** - *A podcast about the past and future of ham radio*. Store and Forward is now a "real podcast" by now being discoverable in the "gigantous list of all podcasts" in any podcast app. Or, you can just listen to Episode 5 in any web browser at the link above. With some judicious editing, K6KJN got this rambling conversation of ours down to a listenable 35 minutes.

It feels like K6KJN and I are getting hitting our intended groove in addressing the work K6KJN does as part of the Digital Library of Amateur Radio & Communications - the *history* of Amateur Radio (***Store***), and the *future* of Amateur Radio as reflected here in Zero Retries (***Forward***). In this episode, we began with both of us gushing about our shared admiration for the late US Navy Admiral Grace Hopper. *What an inspiration she was in the computing industry*!

FCC Docket 24-240 Deadline for Comments is *Thursday 2024-09-05*

As I finish editing this issue of Zero Retries, there are now 307 comments filed in FCC Docket 24-240, NextNav's attempted hostile takeover of the US 902-928 MHz band.

As of this issue of Zero Retries, I have not yet completed my study of all of the comments filed to date, nor have I completed my comments on this issue. To give Zero Retries readers a chance to read *my* comments on FCC Docket 24-240 and formulate their own comments, I'm planing to publish Zero Retries 0168 as a special issue devoted to addressing FCC Docket 24-240 on **Tuesday 2024-09-03.**

Not only is NextNav's attempted hostile takeover of the US 902-928 MHz band an existential issue for Amateur Radio's continued (and projected, especially *data*) use of the 902-928 MHz band, it's an existential issue for continued use of that band for many other user communities that have evolved in the past two decades, including self-education of the "Spectrum Workforce" and STEM education in radio technology.

It's going to be a long weekend… but hopefully the intense sprint will relax after Zero Retries 0168. Then…

Maybe, Perhaps, *It's Possible* To Take a Little Break in September

At the beginning of Summer 2024, I imagined that perhaps in late July or August I would queue up a few "Best of" issues of Zero Retries to allow at least a two or three week block of time to work on some bigger projects in the project queue of N8GNJ Labs. One example is repairing the bent antenna mast damaged by last winter's "Whistling Whatcom Winds" that nags at me every time I step outside to walk between my house and N8GNJ Labs.

But… there have been *so many* Zero Retries Interesting developments happening in Summer 2024 that *each* week it felt like *this* week, current developments really deserve to be covered. Thus, I haven't taken a break from Zero Retries to date; I've just kept going each week.

But, Summer is quickly waning here in the Pacific North*wet* - the monsoon weather is fast approaching, and those bigger projects in N8GNJ Labs are *still* in queue. So, after this big "APRS Foundation" issue, and Zero Retries 0168 being a Special Issue focused on my comments for FCC Docket 24-240 at least a few days prior to the Comments deadline of 2024-09-05…

Then it might be time for at least a two week "break" from Zero Retries to work on the highest priority of those deferred projects. There will still be a Zero Retries issue published during those weeks; but the majority of the content of those "break" issues will probably "recycled".

This plan is not firmed up, so consider this a potential "heads up". Thanks in advance for your understanding.

73,

Steve N8GNJ

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Image courtesy of Appalachian Trail Golden Packet

A Conversation with Jeff Hochberg W4JEW - Part 1 - the Appalachian Trail Golden Packet 2024 Event

By Steve Stroh N8GNJ

My conversation with W4JEW was wide ranging, and instead of this article being in the form of an interview, with extensive quoting, with many references that weren't part of the conversation, it just worked better to make this article an edited synopsis of the most salient portions of the conversation.

This article, Part 1, reflects the extended conversation that W4JEW and I had regarding the Appalachian Trail Golden Packet 2024 Event. This annual event is not (currently) formally affiliated with the APRS Foundation, but as an event where success is measured in technical accomplishment rather than operational issues such as numbers of contacts, ATGP is Zero Retries Interesting. Thus I was interested in learning more about ATGP directly from W4JEW who is one of the coordinators of the event for the past several years.

The Appalachian Trail Golden Packet 2024 (ATGP 2024) event was held on Saturday, July 20, 2024 along the entire length of the Appalachian Trail.

> About the Appalachian Trail (AT):
>
> The Appalachian National Scenic Trail — more commonly known as the Appalachian Trail or "the A.T." — is a unit of the National Park System. Fully connected in 1937, the A.T. stretches from its northern terminus at Katahdin, Maine, to its southern terminus at Springer Mountain, Georgia. At more than 2,190 miles in length, the A.T. is the world's longest hiking-only footpath.
>
> About the Appalachian Trail Golden Packet event:
>
> Every year for the past 15 years, licensed amateur radio operators coordinate 15+ sites along the length of the Appalachian Trail from Maine to Georgia. We use transceivers to exchange packet data between each site with the goal of sending the "golden packet" the entire length of the trail!
>
> Robert Bruninga (WB4APR - Silent Key), the creator of the APRS protocol, founded the Appalachian Trail Golden Packet event. The intent is to get licensed amateur radio operators ("hams") to feel more comfortable with operating in the field, while demonstrating the ability to send real-time messages along 2200+ miles without the need for any infrastructure!

W4JEW added a bit more history of ATGP, that WB4APR originally envisioned the creation of a network for APRS activity along the length of the AT so that there would be 100% coverage of APRS (traditional 144.39 MHz) along the AT, even for users of low power portable radios transmitting APRS data. That would be accomplished by creating a backbone network for APRS on the Amateur Radio 220 - 225 MHz (now 222-225 MHz) band, with gateways on 144.39 MHz. The basic idea was that 144.39 (the US national APRS frequency for 1200 bps Audio Frequency Shift Keying (AFSK) - traditional Amateur Radio Packet Radio) along the AT would be reserved for APRS users on the AT, and the 222-225 MHz network would handle routing the APRS data into and out of those 144.39 MHz digipeaters which would be reserved for use by AT users on low power portable radios. To date, the 220-225 MHz network has not been realized, but the idea has not been abandoned either. (And is even more possible than ever now with various radios and modems and computers such as Raspberry Pi that can be used as routers.)

ATGP is considered by many to be a legacy / memorial to Bob Bruninga WB4APR. But beyond the WB4APR legacy, ATGP is an active Research and Development project. Until the last several years, only APRS mobile radios by Kenwood were used. Using only the Kenwood TM-D700, TM-D710, and TM-D710AG (TM-D7xx) minimized the variability of radio / modem combinations, and because Kenwood implemented a feature called **uiflood**. For ATGP, the internal TNCs of the TM-D7xx radios are used, again, minimizing variability among ATGP stations.

There are typically twenty five or so participants that operate these specially configured / specified APRS nodes on various high points along the entire length of the AT.

For "intense" fans of APRS, ATGP is the equivalent of Amateur Radio Field Day.

But several years ago, Kenwood discontinued the TM-D710 product line (and the closely related TM-V71A). Since the Kenwood TM-7xx radios were no longer available (and became very expensive on the used market), ATGP "commissioned" the development of an "ATGP Appliance" to be able to continue the consistency of radios and modems used for ATGP. The ATGP Appliance was specified and developed by Don Rolph AB1PH. The initial design of the

ATGP Appliance was documented by AB1PH:

An Open Source Meta-Design for an APRS™ Appliance

> **Positioning of Effort**
>
> This effort resulted in what might be termed a meta-design. The effort was critically dependent on the Dire Wolf TNC software written by John Langner, WB2OSZ, and should more correctly be thought of as an application note for John's software. It is a meta-design because it has a few core principles, but the implementation can and has utilized a variety of hardware configurations and run successfully.
>
> **Summary**
>
> An APRS™ implementation, nicknamed the APRS™ "Appliance," was developed, underwent performance testing, and then field testing including use at the Appalachian Trail Golden Packet event. The APRS™ "Appliance" offers the potential of a high performance open source software and open hardware design which can be readily assembled from purchased parts (only the enclosure may need 3D printing) and can provide a low cost (~$130) alternative for deploying APRS™ implementation. It is called the APRS™ "Appliance" because once configured, for normal use one needs only to turn it and . No other actions are required.

The "Appliance" was originally published in **ARRL QEX** - September / October 2023, pages 30-35 (thus currently only available to ARRL members behind the ARRL publications paywall). A version of this article is available in the GitHub repository of the project APRSFoundation / aprsappliance. There is also a video - **AT Golden Packet - January 2023 - APRS Appliance - Don AB1PH** where the APRS Appliance is discussed.

One of the features of the "Appliance" was that it uses the DIRE WOLF software TNC which had support for the **uiflood** feature added in at the request of ATGP.

One of the surprises to ATGP participants after the was that the DIRE WOLF TNC performed better (decoded packets more reliably) than the Kenwood TM-D7xx radios' internal TNCs. For an explanation of why DIRE WOLF is superior, see this article. (Basically, better software, better modems, more powerful computing capability.)

In the absence of the TM-D7xx radios, suitable radios for use with the ATGP Appliance must provide "flat audio" to the modem unit for best high speed data performance. Although not mentioned in my discussion with W4JEW, the most suitable such radio (currently in production, operates on 144-148 MHz, at least 25 watts power output, and provides flat audio to the standard 6-pin MiniDIN connector) would seem to be the **Yaesu FTM-6000R** with the use of the **Yaesu CT-164** "Data Cable MDIN10 pin to MDIN6 pin" adapter cable.

See also **Zero Retries Guide to VHF / UHF Radios for Data** - for discussion of other suitable radios.

On the ATGP web page, the most current configuration of the ATGP Appliance (for use during the 2024 event) is well-documented.

In recent years, ATGP was split into two phases:

> **Phase 1 – ATGP Classic**
>
> Operate with Kenwood radios only; do not use "Appliances" during this phase. This phase does not end until the golden packet has been successfully passed and Lynn has given the go-ahead for Phase 2.
>
> **Phase 2 - ATGP Appliance**
>
> Operate with the ATGP Appliance.

Notably, ATGP 2024 was conducted using *only 9600 baud*; 1200 baud was not used.

As part of the ongoing refinement (research) in the quest of a routinely successful ATGP, there is a new position amongst the participants of ATGP - "Shack Potato". In 2024 Lynn Deffenbaugh KJ4ERJ assumed this role, which monitors and records the entire event via the Internet using the extensive APRS Internet Server (APRS-IS) connectivity. The idea is that by not being an on-air participant, but monitoring and recording the entire event via APRS-IS with better computers and connectivity, a better after-event evaluation can be conducted.

The Appalachian Trail Golden Packet 2024 - After Action Review was recently conducted and shared on YouTube:

ATGP 2025 (the 17th year) is scheduled for Saturday July 19, 2025.

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A Conversation with Jeff Hochberg W4JEW - Part 2 - State of APRS Foundation - August 2024

By Steve Stroh N8GNJ

Up front, this article won't seem like the usual Zero Retries fare about technological advancement in Amateur Radio… no new technology (at least, not yet), no sexy hardware revealed (other than the existence of the ATGP Appliance in the previous story), nor any cool new software. Admittedly what follows is mostly "administrivia" about a new organization.

*But, in my mind, this **is** a story about technological innovation in Amateur Radio. Automatic Packet Reporting System - APRS[1] is such a sprawling, diverse, and (hopefully, still) interoperable technology in Amateur Radio that I really feel that there needs to be some unifying entity that can, at a bare minimum, keep all of the "pieces" of APRS "flying in reasonably close formation", and thus my advocacy for APRS Foundation.*

I consider APRS to be one of the foundation technologies of what makes Amateur Radio "Zero Retries Interesting" in the 2020s and beyond. But of late, there is a perception within Amateur Radio that APRS is… if not "dead", but perceived to be merely a boring utility of "beacon out my position data using old, slow, 1200 bps AFSK."

APRS does a lot now, but it could be doing so much more, such as evolving to better, more robust modulation techniques beyond 1200 bps Audio Frequency Shift Keying (AFSK) modulation.

*Actually… APRS **is** evolving as I suggest - being used with VARA HF, with WSPR, even with LoRa. APRS' creator Bob Bruninga WB4APR, in his role as APRS creator and de facto Benevolent Dictator effectively coordinated such diverse uses of APRS so that they would interoperate. But with WB4APR's transition to a Silent Keyboard on 2022-02-07, the leadership and coordination… the evolution of APRS, was left in limbo. Since then, "APRS" seems to fragment with each new development, with each new hardware device offering the developer's individual creativity of innovating on APRS, but without updates to the APRS specification for years now to insure compatibility.*

One example of the "drift" of APRS that I'm seeing is that APRS has an integrated messaging capability - effectively "texting" within the APRS infrastructure, that is mature and capable… and yet rarely used. Amateur Radio could be "showing off" APRS messaging to interested folks that are beginning to experiment with Meshtastic via inexpensive wireless units that operate (unlicensed) in the 902-928 MHz band using LoRa technology. But visibility (and usage) of APRS messaging has languished because it was only accessible in dedicated APRS software or embedded in APRS-capable radios such as the Kenwood TM-D700 and later radios, requiring the text input to be done, painfully, with a 12 or 16 button keypad on a microphone. The closest we have to usable, portable apps for APRS messaging, for example with the new Kenwood TH-D75A portable radio is the APRS-Fi app for iPhone or iPad, and APRSdroid app for Android devices. Both of these apps are "map centric" with messaging as an "can also do" capability rather than a great "messaging first" application that would really showcase APRS messaging[2].

Jeff Hochberg W4JEW announced the formation of the APRS Foundation on 2022-03-02, and I considered that a promising development in the aftermath of WB4APR's passing. An "APRS Foundation" seemed like a logical development to guide the future of APRS. But after that initial announcement and a few terse mentions, there was no real news, information, or updates from APRS Foundation for more than a year. I would periodically mention the APRS Foundation in Zero Retries when there was something slightly newsworthy, but until this interview, there was little of substance to report. On the rare occasion I was able to "peek inside" APRS Foundation, I was told "we're busy doing stuff", but that was all that I could learn - until W4JEW and I spoke for more than two hours in early August, 2024.

As was the case with Part 1, my conversation with W4JEW was wide ranging. Thus instead of this article being in the form of an interview, with extensive quoting, with many references that weren't part of the conversation, it just worked better to make this article an edited synopsis of the most salient portions of the conversation.

Founding / Foundational Issues Are Complete

As of August 2024, APRS Foundation has worked through its formation issues:

- Formed its five-person Board of Directors
- Received its 501(c)(3)3 status
- Now accepting (paid) memberships
- Now accepting individual donations
- Can now begin to apply for grants
- Defining roles needed for volunteers to step into

See more details in the "What's taken so long" section.

Thus now APRS Foundation can begin moving towards its longer term goals of assuming formal stewardship of APRS - managing, guiding, and evolving APRS in the 2020s and beyond… as a successor to WB4APR's leadership of APRS.

As one of the opening discussions, I mentioned that a piece of wisdom from the death of another visionary who left behind a legacy - Apple's CEO Tim Cook was specifically told by Steve Jobs to not be guided by "What Would *Steve* Do?"

> As he took the microphone at the memorial to Jobs held at the company's Cupertino campus, Cook said, "Among his last advice he had for me, and for all of you, was to never ask what he would do. 'Just do what's right.'"

I think the same thing should apply to APRS and the APRS Foundation - don't ask "What would *WB4APR* do?" but rather "what is the *right* thing for to do for APRS" - in *this* era, with the resources of a *foundation*, with the *technologies* we *now* have available. WB4APR was an *individual*, having created APRS *more than two decades ago* with the technology of *that* era. What worked and was right *then*, for WB4APR, isn't necessarily what will work, and is right, *now* for the APRS Foundation.

New, More Informational Web Page

The most notable change that signals that APRS Foundation is entering a new, energetic phase is that it now has a much more friendly and informative web page at www.aprsfoundation.org. Notable improvements are:

- Membership section and solicitation for membership dues
- Can accept financial donations (beyond becoming a member)
- Most importantly, APRS Foundation is now sharing fundamental information about itself on its website rather than solely on two email lists (that can get very busy and thus only followed by those very interested in APRS detail). Example - Why did we start the APRS Foundation?

That last point was one primary criticism I had with the APRS Foundation was that when one went to the Foundation website… there was *almost no detailed information available about the APRS Foundation* - just some generalities. Apparently, that plaint was heard and is being fixed.

I note that another section that's needed on the APRS Foundation website is a "News / Press" section with basic primers on APRS, photos, logos, where press releases are posted, mentions of articles about APRS, etc.

(Many) Volunteers Needed - Details To Follow

One of the things that W4JEW emphasized several times is that the APRS Foundation Board cannot do "all the work that is needed" to take APRS and APRS Foundation to the next stages. Many people (all volunteers) will be needed, to fill a number of diverse roles.

> Watch for upcoming messages to find an area where YOUR expertise is needed.

The scope of those roles hasn't yet been fully defined, nor *can* many such roles be defined quite yet - see below.

Budget - Not Much, Yet

To date, APRS Foundation is operating on a financial shoestring, with expenses to date paid from individual donations when needed, as needed. Individual paid memberships will help APRS Foundation create at least some financial cushion, and individual donations will also help. But there is hope that some grants can be obtained to help with significant expenses that will likely be encountered in APRS Foundation's next phases.

One early goal with sufficient funding is for the APRS Foundation Board members to attend several major Amateur Radio events to represent APRS, beyond those in close proximity to where they are based (in driving range).

From the financial perspective of allocating funds for future projects, I discussed the role of the Digital Communications Conference (DCC) in the very early formation of APRS, and it was disappointing that the TAPR DCC will not be held this year, either in person or virtually and thus rekindle the collaboration for APRS that routinely happened at DCCs.

After our conversation, W4JEW put out a poll on the two APRS email lists asking if an APRS conference in-person or virtual would be preferred, and the majority preferred a virtual conference. Thus, a virtual conference dedicated to APRS is still a possibility in 2024. But of course, this is another example of "the Board *cannot* do it *all*" and volunteers will be needed to create and conduct such a conference.

APRS, "Inc." - Currently Within TAPR

When WB4APR learned that his illness was likely terminal, he transferred the assets of APRS, such as the APRS trademark authority, to TAPR. Per W4JEW, TAPR views their role with APRS as “temporary custodian”. Now that APRS Foundation is in place, talks will soon commence to discuss the transfer of the assets of APRS, including the trademark authority, to APRS Foundation. Such a transfer is not a given.

APRS.ORG Website

APRS.ORG was WB4APR’s website on behalf of APRS, and was transferred to Steve Dimse K4HG in a similar custodial arrangement to the transfer of the APRS assets to TAPR. There is a great deal of content there, and APRS.ORG continues to be the primary reference for APRS information, though it has not been updated for years now since before the death of WB4APR. APRS Foundation considers the transfer of custody, re-hosting, and updating APRS.ORG as one of its primary tasks. Per W4JEW:

> In the one of the emails that I sent to the email lists, I was listing jobs including Webmaster. We need people who can go through and edit content. We need people who can migrate content from whatever format it’s in to something like Markdown, so that it's really nice and easily portable.

APRS Protocol Reference (Specification)

The APRS Protocol Reference 1.0 was created and Copyright ©2000 by APRS Working Group All rights reserved.

Since 2000, of course, there have been many updates to APRS, some of which have been incorporated in various proposed updates, etc. The “APRS Specification” is currently in limbo as “The APRS Working Group” has not been a “Working Group” for some time, but the formal custody of the original specification remains with TAPR.

Thus there are two tasks ahead related to the APRS Specification:

- Transfer formal custody / ownership of the APRS Protocol Reference 1.0 (and follow-ons) to APRS Foundation
- Update the APRS Protocol Reference to current technology, practices, etc.

Per W4JEW, the latter is largely complete:

> The updating (the backlog of changes) of the APRS Protocol Reference (Specification) is competed and ready to go. John Langner WB2OSZ compiled all the updates through version 1.1D. We might call the first one from APRS Foundation version 1.1E, or perhaps just version 2.0 - to be determined.
>
> Our next step is to get permission from TAPR to publish the original, and updated specification with *Copyright by APRS Foundation*.

Other Longer Term Goals of APRS Foundation

- There are a number of websites that are part of the worldwide APRS infrastructure, and other information sources that may be interested in their services and content and information being transferred to APRS Foundation. One example is legacy APRS software that is no longer maintained.
- Rebranding - after 20 plus years, W4JEW thinks “It may be time for a newer, more modern logo. That would help make a transition from *WB4APR’s* APRS to *APRS Foundation*.

Image courtesy of APRS Foundation

I put one example as a prototype on the APRS Foundation website." (Shown above.)

- I discussed the possibility of APRS Foundation "chapters" with the example of Northwest APRS here in the Northwest corner of North America. We used to have an annual "Summer Gathering" but that event died during the COVID-19 shutdowns. W4JEW mentioned "I've had a couple of people reach out to me as well. They want to be kind of "technical evangelists" that would be interested in going out and doing speaking engagements on APRS. I would love to see that."
- New videos reintroducing APRS (perhaps showing the use of more modern technology and systems). W4JEW noted "There are many Youtube videos that just say *APRS is dead*."
- The aforementioned APRS Foundation APRS virtual conference.
- Formalizing a system for suggesting changes to the APRS Specification, similar to the Internet's Request For Comments (RFC) system.

W4JEW - Concluding Comments

My closing observation to W4JEW was that APRS Foundation seemed to be hiding behind a veil of silence. In the absence of solid information, imaginations can go wild. It's apparent now that APRS Foundation was doing a doing a lot, but it wasn't "reporting out". Now that W4JEW and I have

had this conversation, resulting in this article, I'm glad that phase of “silence” is now drawing to an end.

W4JEW said:

> You’re right that we probably weren’t communicating as much as we should have been. Communication is a hard thing. And that’s funny because we're all Hams and we're *supposed* to be communicating. When you don't [proactively] communicate, people can be a victim of their own imaginations. In speaking with you today, I'm hoping that you understand we have *not* been sitting idle. We *have been pressing on*, maybe not as quickly as people would like. I feel like I have the right people involved. I want *more* good people involved. We are ready to execute.

I’m grateful to Jeff Hochberg W4JEW for taking the time to talk substantively and candidly to me for these articles despite recovering from recent surgery, and as I finish this article, recovering from a significant illness. I’m hopeful about APRS Foundation and the future of APRS as a Zero Retries Interesting technology in Amateur Radio.

I hope that Zero Retries readers will choose to help support APRS Foundation financially and volunteer to help APRS Foundation as the calls go out for specific types of help. *Amateur Radio really needs APRS to continue to evolve*, and it’s my opinion that for that to happen, we need a very active APRS Foundation.

Leave a comment

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Breaking - APRS Foundation Membership is NOW OPEN!

Jeff Hochberg W4JEW on the aprssig email list:

> APRS Foundation Membership is live! Membership is available to anyone anywhere across the globe! You don’t need to be a licensed amateur radio operator to join!
>
> We evaluated several membership management platforms and selected a relative newcomer in the space - Raklet.
>
> Visit the Membership page on the Foundation for details and the link to the membership management application:
>
> https://www.aprsfoundation.org/membership
>
> If you aren’t a licensed amateur radio operator, enter “NOCALL” in the callsign field when submitting the form.
>
> To give an idea of the benefits of membership, we took a poll last week to determine the level of interest in an APRS Foundation-sponsored event to be held around Dayton Hamvention 2025.
>
> Your APRS Foundation Membership would allow you to attend the event for free, whereas non-members would have to pay USD $15.00.
>
> So, right away, one event pays for the event and helps support our operating expenses! And that's just the beginning!
>
> We are excited to have you join us in Ensuring the Future of APRS!
>
> Thanks for your patience and understanding!

Leave a comment

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Breaking - APRS.ORG to be Transferred to APRS Foundation

Steve Dimse K4HG on the aprssig email list:

> Congrats to the APRS Foundation for going live. A lot of work has gone on behind the scenes to get to this point, but what happens next is up to all of you.
>
> First, as an old man, I am contractually obligated to start with a history lesson. In the beginning there was Bob, and APRS only ran on DOS. Bob wasn't a programmer and had no interest in learning anything more modern than DOS. In the mid-90s the Sproul brothers decided to write a Mac version, and later added Windows. They made a deal with Bob to split their registration fees. He never got rich from APRS, but the earnings were put into his daughter's college fund, I suspect mostly as a way to justify the time he spent away from the family playing with computers and radios.
>
> In 1996 I wrote javAPRS which ran in a browser. I did not charge, either to use it on the web, or to create your own web site using it, so there was no money to share with Bob. This greatly angered Bob. We would butt heads over the next five years, though in the end he did come to accept that javAPRS and the rest of the APRS Internet System I created had greatly expanded the world of APRS and helped his income. Other early APRS programs like APRS+SA, PalmAPRS, etc. made deals with Bob as well.
>
> The problem was part of the deals Bob made was exclusivity. No one else could make a Windows or Mac version unless the Sprouls approved it, no other Palm version unless Mike Musick approved, etc. We fought over this for a while, and it came to a head in 2003 when a number of new developers started getting dumped on as I was in the beginning as Bob tried to protect his income. Most of our fights over the years were private but this was very public and nasty. Best community comment: "This is like watching your parents fight!" Ultimately I won, leading to the creation of the APRS Working Group and the APRS Spec, opening APRS to any developer.
>
> Over the years the Working Group never did much else than create the spec as the early developers drifted away, and Bob became the

> guardian of the spec by default, with me acting to put brakes on his crazier ideas. While he was terminal we had a lot of talks about the future of APRS. He wanted me to take over everything he did, which I have no interest in. I agreed to take back aprs.org <http://aprs.org/> (I had registered it in 1997 when I got aprs.net <http://aprs.net/>, and transferred it to him when he was ready to do his own web site separate from the USNA).
>
> I told him my plan was to encourage formation of a new organization similar to TAPR that would represent all APRS users and developers, something I had wanted him to do for decades, and he agreed to that. Jeff et. al. was the only group that showed interest when I explained my plan after Bob's death. It has taken a while, but they are incorporated and accepting members. I required them to have an open membership before I gave them access to the aprs.org <http://aprs.org/> web site. I did that this morning, and I will transfer the domain before it comes up for renewal in April. Bob wanted to give me the APRS trademark, but I had no interest in the hassle, so I recommended he give it to TAPR for safekeeping (N8UR is a retired IP lawyer), and if the Foundation takes off I expect TAPR will transfer it there.
>
> So as I said, what happens now is up to you. For the first time in its thirty-odd year history, APRS has the chance to be a community steered entity, but only if you join me in supporting the APRS Foundation.
>
> Don't blow it!

Leave a comment

Share

Announcing - https://how.aprs.works

Normally a brief mention such as this would be included in ZR > BEACON (Short mentions of Zero Retries Interesting items), but given the preceding four articles were related to APRS, to maintain "flow" of the topic, I'm including it as an article.

Jeff Hochberg W4JEW on the aprssig email list:

> Here's yet another exciting announcement from your friends at the APRS Foundation!
>
> We continue to hear two recurring themes (in no particular order):
>
> 1. There needs to be more accurate & up-to-date information on the APRS protocol.
> 2. The ham community wants/needs a solid beginner's guide to APRS.
>
> Enter https://how.aprs.works!
>
> While http://www.aprs.org is technically the authoritative source for APRS, we fully recognize the site is challenging to navigate, dated-looking, contains stale information, etc.
>
> We wanted to get something in the hands of the APRS community as quickly as possible! There's not a lot of content yet, but you can contribute here! (More details below.)
>
> How APRS Works is a brand-new site that sits atop Ghost (https://ghost.org), a blogging platform similar to WordPress. Ghost is much more modern, easier to work with, fast, and gorgeous!
>
> While the site is owned and managed by APRS Foundation Inc., it is for the entire amateur radio community worldwide! While we got things started, we do not want to be 100% responsible for writing the articles (nor do we have the time to do so).
>
> How APRS Works is designed so that anyone can write posts. However, we want to ensure that the posts are accurate and reliable, so new posts will be moderated to ensure high quality and accuracy.
>
> If you are up to the task and interested in authoring documents for the site, you can use the Contact Us form on the APRS Foundation website to ask for an account, and we will send you an invitation.
>
> Also, if you have other ideas about what content should be on the site, don't be shy—let us know!
>
> We hope you're as excited about the new site as we are!

The issue that this new blog from APRS Foundation addresses was an observation of mine that W4JEW and I discussed during our conversation. I'm glad to see that this blog has now gone public, and those basic questions, and some answers, are being addressed. "how.aprs.works" is a good start for APRS Foundation to reach out to new APRS users with *current* information on APRS.

ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

Unlock the Secrets of the Invisible Radio Universe with SuperKnova®

*ARDC Press release (and article on NRAO website) from **U.S. National Science Foundation National Radio Astronomy Observatory** and **Amateur Radio Digital Communications**:*

> ***STEM coursework is available without cost to learners of all ages from the U.S. National Science Foundation National Radio Astronomy Observatory, thanks to funding from the Amateur Radio Digital Communications***

August 28, 2024 — Wireless technology is central to our modern world. You may be reading these words on a smartphone or tablet using WiFi — all of these devices use the same electromagnetic spectrum (EMS) as radio astronomy. Learning these fundamentals can offer a better understanding of the technology we use in our daily lives and provide valuable, transferable skills required in many present and future careers.

The U.S. National Science Foundation National Radio Astronomy Observatory (NSF NRAO), and its administrator Associated Universities, Inc. (AUI), have created SuperKnova, an online educational platform that provides inclusive, equitable access to radio technology learning and training. “Our goal is to broaden participation in STEM by offering no-cost training and education in skills that help prepare learners for STEM careers,” shares Valarie Bogan, NSF NRAO SuperKnova Program Manager. The SuperKnova website has a wealth of free educational resources for teachers and learners of all ages. Topics include history of radio astronomy, the physics of radio technology, and even cube satellites.

SuperKnova instructor Jesse Alexander (WB2IFS) with students Sullivan Gutierrez Torres, Logan Slimp, and Nejon McBride-Stubbs (KJ5AXD), from the pilot cohort at the HamSCI 2023 Workshop.

The Electromagnetic Spectrum and Ham Radio

The NSF NRAO is excited to announce that, thanks to a generous grant from Amateur Radio Digital Communications (ARDC), learners can now enroll in two self-paced courses to learn the fundamentals of radio communications. The Technician Amateur Radio License and EMS Course introduces learners to the electromagnetic spectrum using amateur (ham) radio as a vehicle, and helps them to prepare to take the exam for licensure. Starting with the basics of radio waves, electronics, and simple radio equipment, students then continue learning challenging topics, such as frequency, propagation, antennas, and general circuitry.

Those who have earned their Technician license can advance to the General Amateur Radio License and EMS Course, where learners will have, over the course of twelve lessons, more in depth instruction on the electromagnetic spectrum and amateur radio, including electrical principles such as reactance, impedance, resistors, capacitors, and inductors. The course then delves deeper into these subjects with lessons on filter types, oscillators, the structure of the ionosphere, and FCC rules.

Project instructor Jesse Alexander (ham radio call sign WB2IFS) adds, “This is a great opportunity to share amateur radio with a new generation of potential ham radio enthusiasts.

We’ve designed this course to introduce learners to the electromagnetic spectrum while developing radio skills and knowledge.”

Lyndele von Schill, director of the NSF NRAO office of diversity and inclusion, notes that many organizations have come together to make these resources possible. “Thanks to the support of the U.S. National Science Foundation, with administration by AUI, and additional support from the ARDC, the SuperKnova program has emerged as a valuable and free resource to students and educators across the country.”

“The electromagnetic spectrum is fundamental to amateur radio and significant in many professional fields,” says Rosy Schechter (KJ7RYV), Executive Director at ARDC. “Developing coursework on an accessible platform like SuperKnova benefits both the learner and the longevity of amateur radio. I love the work that is happening with this program at NRAO, and I’m so happy to see this curriculum out in the world.”

Amateur Radio is certainly doing something right by attracting, simultaneously, the attention of the National Science Foundation (NSF) and the famed National Radio Astronomy Observatory (NRAO) to get STEM students learning more about radio technology. Kudos to NRAO for developing this curriculum, and kudos to ARDC for funding NRAO to do that development!

M17 Text Messaging Proof of Concept Demonstration

Wojciech Kaczmarski SP5WWP via email:

> I quickly wrote a simple GUI app for Linux, demonstrating M17 packet mode. It transmits text messages, UTF-8 encoded, nothing more. It is supposed to be used with Digirig and an M17 capable mobile transceiver.

> You connect it all together, enter your message and hit the "Transmit" button. As simple as that. No fancy hardware required.
>
> https://github.com/M17-Project/m17-texting

I am… *regularly*… ***amazed*** at the capabilities of M17 that are revealed in projects like this from SP5WWP. It's still a project of mine to capture all that I have learned and written about in Zero Retries about the deep and myriad capabilities of M17 that take it *well beyond the capabilities of the other digital voice systems* for VHF / UHF currently used in Amateur Radio, especially the *integral* data capabilities of M17.

Wow… and WOW! Thank you SP5WWP for this proof of concept demonstration!

New Kenwood Mobile (Data?) Radio Teased for 2025

Icom, Kenwood, and Yaesu all displayed future Amateur Radio units at last weekend's Ham Fair 2024 conference in Tokyo, Japan. **Amateur Radio Daily**'s Friday August 30, 2024 issue gave a good synopsis of these "new radio reveals". While there were some Zero Retries Interesting elements in the Icom and Yaesu units, *the most Zero Retries Interesting unit* (and the least developed unit) was from Kenwood, apparently a replacement for the Kenwood TM-D710AG. And, hopefully, also a "de-featured" variant as a replacement for the Kenwood TM-V71A. What Kenwood displayed wasn't even as advanced as a prototype, just a mockup of a display unit and a radio unit with some basic features listed:

- Dual Band - 144-148 MHz and 440-450 MHz. I've seen some mention in other references to this radio that 222-225 MHz will also be included in this radio. That would make sense if this was, as many have speculated, a "mobile version" (big brother) of the new Kenwood TH-D75A, which does include 222-225 MHz as well as 144-148 MHz and 440-450 MHz.
- Display unit like the TM-D710AG, includes a front-facing speaker and a total of 13 soft keys around the display - 4 on the left, 4 on the right, and 5 along the bottom. ~~All the photos were black and white (???) so it's unknown if the display will be color or monochrome.~~ **Update 2024-09-02** - My thanks to Matt Liggett KO6BKV for pointing out that the photo on hamlife.jp *is* actually a *color* photograph - look for the *tiny* splash of red in the W of the Kenwood logo on the display unit. (You may have to zoom in on the photo, as I did. Thus… I guess the display unit will be (very) monochrome, or at least this mock up display is.
- Integrated GPS receiver
- Supports APRS and D-Star
- USB-C ports on both the display unit and the radio unit
- SD card port on the radio unit
- Functions of the USB-C and SD card ports weren't specified.
- Unlike the TM-D710AG and TM-V71A, no 6-Pin MiniDIN ("data" / flat audio) port was shown in the available photos.
- Targeted for release in 2025.

The data functionality of this radio is a *complete unknown* other than to guess that, like the TM-D710AG, there will be an internal TNC with modems for 1200 bps AFSK and 9600 bps FSK. I hope… *hope*… ***hope***… that Kenwood's engineers will be forward-thinking enough to make the TNC capable of real data transfers 4 and to make the modems software-based, with various features so that the radio can be used for data communications.

It's also unknown, but hoped, of course, that like the TM-D710AG and the TM-V71A, this radio's basic functions (frequency, TX/RX split, CTCSS, etc.) can be changed remotely.

It would have been *really cool* if there had been a native Ethernet port on this radio, but the photographs didn't show a dedicated Ethernet port. There is the (probably remote) *possibility* that the display unit and radio unit's connection has been updated to Ethernet format and signaling rather than the proprietary Kenwood data format and signaling used over an "Ethernet" cable in the TM-D710AG and the TM-V71A.

Ideally (pure speculation / *wishful thinking* on my part)… Kenwood would release this radio in *three* versions:

- Two piece with "big pretty display" as a direct replacement for the TM-D710AG - probably at least $800, especially if it includes 222-225 MHz.
- Two piece with a minimal display, as an equivalent to the TM-V71A without GPS, APRS, D-Star, or TNC / modems - significantly lower cost than the "big pretty display" version.
- One piece, radio unit only, "black box" version with all control functions remotely controlled via the USB-C port, no GPS, APRS, D-Star, or TNC / modems but the equivalent functionality of 6-Pin MiniDIN ("data" / flat audio) port to be able to use external modems for data communications.

There was also no hint that Bluetooth was included in this radio… though with USB-C, an external Bluetooth module could probably be added.

I'm somewhat hopeful that Kenwood has taken note of Yaesu's new'ish FTM-6000R whose primary differentiation as a new radio is that Yaesu included the equivalent of the 6-Pin MiniDIN ("data" / flat audio) port in that radio. That feature was apparently a very deliberate design decision. I'm told that the FTM-6000R is selling reasonably well to those that want to use it for data communications such as with VARA FM. Thus I hope that Kenwood also wants "a piece of *that* market segment" for a basic data-capable Amateur Radio VHF / UHF unit.

Kenwood engineers - please do us data communications folks proud with this new radio!

And, if anyone from Kenwood is reading this5, and would like arrange an exclusive "Zero Retries Interesting deep dive" about this radio in a *dedicated issue of Zero Retries*… I'm more than willing and eager to do so! Let's talk!

Admiral Grace Hopper's 1982 Lecture at the National Security Agency

Not Amateur Radio related… but still Zero Retries Interesting for Admiral Hopper's significant influence on the early computer industry, overcoming sexism (*female Admiral in the US Navy - back then*) and ageism in both the US military and the male dominated computer industry.

US Navy Rear Admiral Grace Hopper is (deservedly) legendary for her early advocacy of the COBOL programming language. I only recently learned of this particular lecture that was legendary both for her foresight… and its obscurity given that NSA was joked to be an acronym for "*No Such Agency*".

A colleague wrote about this lecture:

> This is simply wonderful. Admiral Grace Hopper gave a talk at the NSA in 1982. Those of us in the security community recently found out about it, and badgered the NSA to declassify and publish it. It's a fantastic time capsule, and an example of her brilliance.

Apparently that "badgering" was pretty intense - the NSA initially declined, aggressively to release this video, with the comical excuse of not doing so because the video was recorded on a now-very-obscure video tape recording format that could not be read by current technology. This was ridiculed, because people that know… *knew*… that *No Such Agency* did in fact have such equipment.

Thus it's… *really something*… for this video recording to be officially released by the NSA. If you watch at least of a few minutes of Part One, I bet you'll be hooked and want to watch the entire video, as I was, and did. We really lost a great one with Admiral Hopper, and we were really lucky to have her, and we're grateful for her persistence in not giving up without realizing her unique highest and best purpose in life and making computers easier and saner to use.

The NSA web page on this lecture:

> Capt. Grace Hopper on Future Possibilities: Data, Hardware, Software, and People (1982)
>
> On August 26, 2024, the National Security Agency (NSA) released a digital copy of a videotaped lecture, "Future Possibilities: Data, Hardware, Software, and People" that Rear Adm. Grace Hopper gave to the NSA workforce on August 19, 1982. This lecture highlights technological foundational principles, valuable perspectives on leadership and shared experiences overcoming challenges in computer science and math. The legacy of Rear Adm. Grace Hopper continues to echo across the intelligence community to light the path for women in STEM.

- Part One (YouTube)
- Part Two (YouTube)

(Anyone else feel like it's a bit surreal to know that *No Such Agency* posted a pair of videos… *on YouTube*?)

Extended Technical Description of the New Masters Communications DRA-Pi-Zero

I thought this was a great primer, not just for the new DRA-Pi-Zero, but also an explanation of some of the issues involved in making a good audio interface unit used for Amateur Radio data communications when Amateur Radio VHF / UHF "voice" radios are used for data communications.

Kevin Custer W3KKC on the DRA email list in response to:

Can you describe the advantages or capabilities that the DRA Pi-Zero has over the Fe-Pi Audio Z v2 board when using it on a KM6LYW DigiPi?

> The short answer is **convenience**.
>
> The DRA-PI-Zero gives you the convenience of not having to build or add another board to handle the PTT logic and LEDs. The two conventional radio jacks are easier to source cables for and are compatible with more radios. And - in the true spirit of Amateur Radio - it's available as a project kit. By contrast - some hams don't like to build projects and maybe can't solder at all. This product is available assembled and tested (A&T) for those that can't or don't want to solder a bunch of stuff together.
>
> The long answer may be better understood with bullet points with added explanations - referenced by a special character:
>
> - Mechanically stable - no need to solder a bunch of stuff together.
> - 3 - LEDs for status of various conditions.
> - 2 - Radio connectors (MD6 and TRRS) - easily connect many radios using one or the other port.
> - TRRS connector is DigiRig compatible - many pre-made cables are available - no soldering required.
> - Header to mechanically select 1200 or 9600 baud receive audio - no soldering required.
> - Onboard pots to easily adjust the audio levels. *
> - RX audio feeds the MIC input of the chip, which by default feeds both the Left and Right channels. %
> - The TX audio signal is fed from the high-power headphone outputs to the TX header. !
> - 47pf bypass capacitors on audio lines - just like other DRA's - to help reduce RFI.
> - The PTT logic is produced by a fast reed relay - compatible with all radios. #
> - Highest audio quality. &
> - Quiet voltage regulation. @
> - Pots and LEDs are not covered by the optional display.

- Large bottom-side ground plane, and top-side ground traces surrounding audio routes - like the DRA-100.
- These help insure quality audio and help reduce RFI issues.

* The larger pot (R12) adjusts the receive audio level. The smaller pot (R14) adjusts the transmit audio level. Audio settings may not require an AlsaMixer change and store. Component identification follows the same convention as other DRA's. This may become important if/when VARA (HF/FM) is installed on a Raspberry Pi platform, or for those that already own other DRA's and understand the reference.

% Because both the Left and Right channels are driven by the MIC input - no channel steering header is (therefore) needed (or provided) for RX audio. The sensitivity of the MIC and Line inputs on the CODEC are exactly the same - so there are no drawbacks to using the MIC input, but there are benefits of using it.

! The TX audio signal is fed from the high-power headphone outputs (NOT the LINE outputs) to the TX header. Maximum TX output level is 3.0V P-P with a 500 ohm load and 2.8V P-P with a 30 ohm load - TX pot wide open and AlsaMixer set to "Max White" (no red). Most portable radios don't need additional AlsaMixer adjustment - but radios requiring elevated transmit audio (many Yaesu and Kenwood mobiles) may require a master level setting in the 70's. This gives the DRA-Pi-Zero nearly the same TX audio output capability as a DRA-50. The TX output impedance is sufficiently low to drive radio modulators and not become loaded down - causing frequency response and group delay problems that can happen when you use LINE outputs.

FET transistor switching is fast - but the reed relay is almost as fast. For the protocols this software supports - it's plenty fast enough. The 2N7000 is a popular PTT transistor but will lock up in the presence of RF (RFI). The last thing we want is for the radio interface to lock PTT ON solid - and require a hard reboot to resolve it. The reed relay adds 1mS to the switching time. The relay is the same one we use in other relay equipped DRA's.

& The highest quality components are used in all DRA's. There are no Tantalum capacitors, transformers, or other "things" in the audio path that ruin good audio. The RX input impedance is sufficiently high enough not to load the source. The capacitors are genuine Panasonic, TDK, Samsung, Richey and Nichicon - most are 105C. For the DRA-Pi Zero, the resistors are XICON and the pots are genuine Bourns.

@ Linear voltage regulation of the Analog supply with multiple bypass capacitors and an inductor to help to insure the best audio signal to noise ratio.

Bonus - With the correct thickness thermal pad - the Mini-DIN6 connector can be used as a heatsink on a Raspberry Pi4.

In an email discussion with W3KKC, I asked why the DRA-Pi-Zero schematic showed there were two separate power supplies. W3KKC replied that separate power supplies for the *digital* section of the circuit, and the *analog* section of the circuit was recommended practice by the modem chip manufacturer.

Leave a comment

Share

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- ***Annual Founding Members*** **who generously support Zero Retries financially:**
  Founding Member 0000 - Steven Davidson K3FZT (Renewed 2024)

  Founding Member 0002 - Chris Osburn KD7DVD (Renewed 2024)
  Founding Member 0003 - Don Rotolo N2IRZ (Renewed 2024)
  Founding Member 0004 - William Arcand W1WRA (Renewed 2024)
  Founding Member 0006 - Todd Willey KQ4FID
  Founding Member 0007 - Merik Karman VK1DF / VK2MKZ (Renewed 2024)
  Founding Member 0008 - Prefers to Remain Anonymous 14
  Founding Member 0009 - Prefers to Remain Anonymous 19
  Founding Member 0011 - Rick Prelinger W6XBE
- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.
- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your QRZ page (or other web presence) and include a link:

  https://www.zeroretries.org
- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
  Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- Dan Romanchik KB6NU mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- Jeff Davis KE9V also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories that often feature "Zero Retires Interesting" topics.
- Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!
- RTL-SDR Blog - *Excellent* coverage of Software Defined Radio units.
- TAPR Packet Status Register has been published continuously since 1982.
- Hot Iron - The Journal of the Constructor's Club is a delightful quarterly newsletter.
- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- HB9BLA Wireless by Andreas Spiess HB9BLA
- KM6LYW Radio by Craig Lamparter KM6LYW (home of the DigiPi project)
- Modern Ham by Billy Penley KN4MKB
- Tech Minds by Matthew Miller M0DQW

These podcasts regularly feature Zero Retries Interesting content:

- Ham Radio Workbench by George Zafiropoulos KJ6VU (and friends)
- Foundations of Amateur Radio by Onno Benschop VK6FLAB

Zero Retries is currently using the Substack email publishing platform to publish Zero Retries. It's particularly suitable for small newsletters as you can get started for no cost.

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Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

Zero Retries / N8GNJ on Mastodon

Zero Retries (N8GNJ) is also on Bluesky — @n8gnj — just click:

Zero Retries / N8GNJ on Bluesky

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- **Store and Forward Podcast** - a podcast about the past and future of amateur radio, by Kay Savetz K6KJN (curator of the Digital Library of Amateur Radio and Communications) and Steve Stroh N8GNJ (Editor of the Zero Retries newsletter.)
- **SuperPacket blog** — *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- **N8GNJ blog** — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs in Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA, and linked to the Internet via **Starlink *Satellite* Internet Access**.

2024-08-30

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Footnotes for this Issue

1

In this article, I acknowledge that APRS™ *is a trademarked name*, formerly a trademark owned by Robert (Bob) Bruninga WB4APR who is now deceased (Silent Keyboard). The APRS trademark is now owned by TAPR. It is cumbersome to continue writing the "™", thus I hope this initial acknowledgement that APRS is a trademarked name… is sufficient for the trademark's owner.

2

In saying this, I mean no disrespect to the APRS-Fi app or the APRSdroid app for Android devices. Both of these apps have been developed to "meet the demands of the market" of casual APRS users, and the need for a "messaging first" app has really only emerged in comparison with the stellar user experience for peer-to-peer messaging as demonstrated by the Meshtastic app. Amateur Radio needs something comparable to Meshtastic, and APRS messaging technology is available, just awaiting better… sexier… messaging apps.

3

In the US, 501(c)(3) is the section of the Internal Revenue Service rules that defines a particular type of not-for-profit corporation

4

The TM-D7xx radios were infamous for their internal TNCs to have minimal memory that was sufficient for APRS, but not for large data packets as are needed for large file transfers.

5

Yes, this *is a shameless pandering attempt to get Kenwood's attention*. I'm completely *unembarrassed* to admit this. 😄